distinctly bifid, with two other basal spots, the central spots confluent and two more spots in the apical region. This interesting specimen the late Mr. W. J. Ashdown identified as an aberration of *A. bipunctata*, and as he was unable to find in his large collection of *Coccinellidae* an exact replica, my specimen is possibly unique, and as such worth recording.

I have also submitted this specimen to Mr. Donisthorpe, and as he considers it worth naming, and in fact first noticed it among my *Coccinellidae*, I should like to associate his name with it, and with his consent propose to name it:—

ab. *donisthorpei*, n.ab. (see plate v., fig. 3).

7. In April last in Trent Wood (a few miles out of Droitwich. Worcs.) I took in decayed leaves in an oak wood at the foot of an oak stump a solitary specimen of *Anatis ocellata*, L., which Mr. Donisthorpe tells me is a new locality for this species.

8. It may be worth recording that on September 13th last I also took by beating an entirely black specimen of *Chilochorus bipustulatus*, L., on pine at Oxshott, and on the same day and place single specimens of ab. *9-punctata* and ab. *cakiles* of *C. 11-punctata*.

The Myrmecophilous Lady-Bird, Coccinella distincta, Fald., its Life History and Association with Ants.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

Coccinella distincta, Fald.

Coccinella distincta, Faldermann *Nouv. Mém. Mosc.* **5** 404 (1837).[1] *Coccinella magnifica*, Redtenbacher *Tentamen Pseudotr.* 24 (1843).[2] *Coccinella septempunctata*, Mannerheim *Bull. Mosc.* **1** 87 (1843)[3] [?]. *Coccinella labilis*, Mulsant *Séc.* 84-86 (1846)[4]; Newman *Zool.* **5** 1864 (1847)[5]; Stephens *Zool.* **5** 1865 (1847)[6]; Mulsant *Species* 1020 (1851)[7]: Sharp *Proc. Ent. Soc. Lond.* **1863** 168[8]; Champion *Ent. Mo. Mag.* **4** 187 (1868)[9]: **5** 45 (1868)[10]; Rye *Ent. Ann.* **1869** 8[11]: **1870** 40[12]. *Coccinella distincta*, Rosenhauer *Stet. Ent. Zeit.* **43**, 166 (1882)[13]; Sharp *Cat. Brit. Col.* 2nd edtn., 22 (1883)[14]. *Coccinella labilis*, Collett, *Ent. Mo. Mag.* **20** 226 (1884)[15]; Wood, *Ent. Mo. Mag.* **22** 163 (1885)[16]; Morris *Ent. Mo. Mag.* **25** 36 (1888)[17]. *Coccinella distincta* Fowler *Col. Brit. Isles* **3** 165 (1889)[18]; Donisthorpe *Ent. Mo. Mag.* **31** 99 (1895)[19]: **32** 45 (1896)[20]; Walker *Ent. Mo. Mag.* **33** 175 (1897)[21]; Donisthorpe *Ent. Rec.* **9** 247 (1897)[22]; Ganglbauer *Käfer Mitt.* **3** 1007 (1899)[23]; Donisthorpe *Ent. Rec.* **12** 173 (1900)[24]: *Trans. Ent. Soc. Lond.* **1901** 367[25]: *Trans. Leicester Lit.-Phil. Soc.* **6** 226 (1902)[26]: *Ent. Rec.* **15** 12 (1903)[27]; Champion *Ent. Mo. Mag.* **39** 151 (1903)[28]; Donisthorpe, *Ent. Mo. Mag.* **39** 206 (1903)[29]; *Vic. Hist. Sussex* **1** 149 (1905)[30]; Donisthorpe *Proc. Lancs.-Chesh. Ent. Soc.* **1905** 37 43[31]; *Eur. Cat. Col.* 363 (1906)[32]; Donisthorpe *Ent. Rec.* **20** 283 (1908)[33]: *Zool.* 446 (1909)[34]; Wasmann *Zeit. Wissens Zool.* **101** 112 (1912)[35]; Fowler and Donisthorpe *Col. Brit. Isles* **6** (*Suppl.*) 254, 326, 329 (1913)[36]; Donisthorpe *Ent. Rec.* **26** 42 (1914)[37]: **28** 35 (1916)[38]: **31** 22 (1919)[39]: *Proc. Ent. Soc. Lond.* Read 7 v. 19[40]: Read 4 vi. 19[41].

Coccinella distincta, Fald., subsp. *labilis*, Muls., ab. *domiduca*, Weise.

Coccinella septempunctata, var. η., Stephens *Mand.*, **4** 380 (1831)[42].

Coccinella labilis, var. B., Mulsant *Séc.* 85 (1846)[43]. *Coccinella distincta*, var. *domiduca*, Weise, *Zeits. Entom.* 7 108 (1879)[44]; Ganglbauer, *Käfer Mitt.* 3 1007 (1899)[45]. *Coccinella distincta* ab. *domiduca*, *Eur. Cat. Col.*, 363 (1906)[46]; Donisthorpe, *Ent. Rec.* 28 35 (1916)[47].

Coccinella distincta, Fald., subsp. *labilis*, Muls., ab. *intertexta*, Weise.

Coccinella distincta var. *intertexta*, Weise, *Best. Tabln.* 109 (1879)[48]; Ganglbauer, *Käfer Mitt.* 3 1007 (1899)[49]. *Coccinella distincta* ab. *intertexta*, *Eur. Cat. Col.* 363 (1906)[50].

Coccinella distincta was described by Faldermann[1] in 1837, from Trans-Caucasica. His insect, which he figures, has only five spots on the elytra, and although this has to stand as the type form, it is in reality only an aberration in which spots 1 are missing. This so-called type-form is evidently very rare; there are no examples of it in the general collection at the British Museum, and it has never occurred in Britain. I have only seen a single specimen, which was taken by the late Mr. W. J. Ashdown, in Switzerland, some years ago in company with a number of examples all possessing 7 spots.

Redtenbacher[2], in 1844, again described the species, under the name of *magnifica*, from Austria. This insect also only possessed 5 spots. The *European Catalogue*[32] treats this as an aberration of *distincta*, Fald., but I do not see any reason for this. His type, from the description, was a little larger, and the spots on the elytra were large—"maculis quinque magnis nigris." The beetle usually has large spots, and varies somewhat in size, and I consider that *magnifica*, Redt., is a synonym of *distincta*, Fald.

Mulsant[4], in 1846, gave a very good description of this lady-bird, which he named *labilis*. He said that it was the *C. magnifica* of Redtenbacher, according to the examples sent to him by that naturalist, and that the latter, no doubt, made a typographical error in saying only 5 spots, since there are 7. I think it is much more probable that Redtenbacher described his type in the first instance from a specimen which had lost spots 1.

Later Mulsant[7] (in 1851) stated that the *C. distincta*, Fald., was evidently the same as *C. labilis*, judging from an individual sent to him by M. de Motschoulsky. In that example, which he had before him, spots 1 were very small, showing by their small size a disposition to become effaced, and that Faldermann had described *C. distincta* from individuals in which these spots had disappeared.

This was no doubt the case. I took a specimen at Weybridge, on September 18th, 1918, in which spots 1 on the elytra are very small, evidently being such a specimen as that sent to Mulsant by Motschoulsky.

The *European Catalogue*[32] treats *labilis*, Muls., as a synonym of *magnifica*, Redt.; but as we have seen, this is not correct. The only form found in Britain is the *C. labilis*, Mulsant, and I consider this form should be called *C. distincta*, Fald., subsp. *labilis*, Muls.

An aberration occurs which possesses 9 spots on the elytra, a small extra spot being present on each shoulder. This is the var. *domiduca*, Weise[44], *C. septempunctata* var. η., Stephens[42], and *C. labilis* var. B., Muls.[43]. It occurs in Britain, I having taken it at Woking, Weybridge, Bexhill, and in the Blean Woods. This should be called *C. distincta*, Fald., subsp. *labilis*, Muls., ab. *domiduca*, Weise.

There is also an aberration described as var. *intertexta* by Weise[18], from Russia, in which some of the spots are confluent. It has not been found in Britain.

C. distincta comes nearest to, and is superficially very like, the common 7-spot Lady-Bird, *C. septempunctata*, L., from which it differs, however, in many important particulars. The anterior angles of the thorax are more rounded and do not project so much in front; the elytra are longer in proportion and not so pointed behind, and their side margins are not so apparent, especially just below the shoulders, where, when viewed from above, they are almost invisible. The spots on the elytra are usually much larger. The epimera of the meso-sternum and the apex of the episterna of the metasternum are white, whereas in *7-punctata* only the former are white. In this last character, however, *distincta* varies considerably. I took a specimen* at Weybridge, on July 28th, 1919, in which the underside is entirely black.

Dr. Sharp has kindly dissected the male genitalia of the two species for me, and he has found that they differ very greatly in this respect; those of *C. distincta* being very highly specialised. He considers that the enormous size of the stop-piece at the base of the median lobe, and the spatulate process from the distal margin of the tegmen, are very striking characters.

Rosenhauer[13], in 1882, described the larva and pupa of *distincta*, and compared them with those of *septempunctata*. As I have never, as far as I can remember, seen the larva and pupa of the latter, I give the differences as stated by Rosenhauer. The larva of *distincta* is somewhat more robust, and the red-yellow colour is more in evidence. The head is more broadly light behind, and the prothorax at the sides. The two other thoracic segments, as well as the sides of the first abdominal segment are marked with a large light spot; other larvæ are entirely light, reaching to the tubercles. The larva of *7-punctata* becomes a pitchy-grey before pupation, that of *distincta* a grey-yellow.

The pupa of *7-punctata* has mostly a predominant black coloration, and the elytra are half black; still this varies so that the wings towards the inner side and apex are black, the shoulder spot free, or with the colour smeared, or the elytra quite red, with three small spots showing, but the shoulder spot is always distinct.

The pupa of *distincta* is always of a red colour with black spots, and very seldom is there a slight indication of a shoulder spot to be seen, the middle spot being always of a considerable size.

Habitat.—*Coccinella distincta* is very widely distributed in Europe, and occurs in Central Russia and the Caucasus.

The British Distribution is as follows:—

Hants., S.: Brockenhurst (*Walker*); Hants., N. Pamber Forest (*Donisthorpe*)[27].

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* This specimen is very curious; the head is all black, the thorax nearly so, and the antennæ, although they consist of the normal number of joints, are so short that they cannot be seen from above, when extended. Moreover, it possesses a sharp chitinous spine, 1mm. in length, springing from the margin of the left elytron, at the shoulder.

Sussex, E.: Lewes (*Morris*)[17]; Guestling Wood (*Collett*)[15]; Bexhill (*Donisthorpe*)[31]; Abbots Wood (*Vic. Hist. Sussex*)[30].

Kent, E.: Kingsgate (*T. Wood*)[16]; Blean Woods (*Walker*)[21]; Whitstable (*Champion*)[9]; Sheppy Cliffs (*Walker*)[21]; Herne Bay (*Dr. Sharp*)[8].

Surrey: Weybridge[11], Esher[12], and Horsell[12] (*Dr. Power*); Woking (*Champion*)[28]; Farnham[12] (*Dr. Power*).

Essex, N.: Birdbrook[12] (*Dr. Power*).

Berks.: Crowthorne (*W. E. Sharp*),

Hereford: Leominster (*Newman*)[5].

Worcester: Bewdley (*Donisthorpe*)[33].

This beetle was first recorded as British by Edward Newman[5], in the *Zoologist* for 1847, who stated that he had taken it at Leominster some years ago, and had placed it in the cabinet of the Entomological Club, where it had remained unnoticed until Dr. Schaum, who was then in London, had called his attention to its specific characters.

In the same publication J. F. Stephens[6] gave a description of the insect, and stated that he had been able to muster up seven examples of this new British *Coccinella*, but he thought that he had placed two or three specimens in the British Museum Collection in 1816.

On September 7th, 1863, Dr. Sharp[8] exhibited a specimen at the Entomological Society of London, taken by himself at Herne Bay a week previously.

Champion[9] [10] next records it in 1868, having swept it in woods between Whitstable and Canterbury in 1866, 1867, and 1868.

It was subsequently taken, as is shown in the British distribution, in various other localities in Britain by other Coleopterists.

Association with Ants.—It may be stated at once that *C. distincta* is only to be found in the immediate neighbourhood of ants' nests, and in this country with *Formica rufa*. The first time in literature that this Lady-Bird was mentioned as actually being connected with ants was in 1888, when C. H. Morris[17] recorded it from near Lewes. He writes: "On June 2nd I came across this rare beetle rather commonly in a clearing of one year's growth; it was a warm sunny day, and they were to be taken in various ways, some by sweeping, others crawling on the ground, or up the trunks of the trees, while many were flying round the nests of *F. rufa*, accompanied by *Clythra quadripunctata*. It would be interesting to know if this insect has been taken in a similar way before; they appeared to be very local, although not uncommon in this particular clearing, in the vicinity of the nests, as we found about 50 specimens in the course of an hour or so." This note is headed "*Coccinella labilis*, Muls., attached to the nests of *Formica rufa*."

Champion's[10] remarks on his capture near Whitstable are significant: "They were confined within the space of a few yards, on a few plants growing at the side of a narrow path; and searching the woods for miles in other directions failed to produce any more."

With our present knowledge we know at once that there was a nest of *Formica rufa* situated on that spot beside the path.

Collett[15], in 1883, found the beetle in some numbers, and he says, "The locality was the wood at Guestling, where I worked the nests of *Formica rufa*." He, however, failed to draw the natural inference.

Fowler[18] says it is found in sandy places, by sweeping heath, etc., and gives the then known British distribution. He mentions "Lewes, in and about ants' nests," from Morris's record; but it was not yet realised that this Lady-Bird was *only* to be found with ants.

Donisthorpe[19] recorded it with *Formica rufa* in 1895, and in 1896 he[20] gave it as one of the regular guests of that ant.

Walker[21] found it in fair numbers in the Blean Woods in 1897, "chiefly on young shoots of oak and birch in the vicinity of nests of *Formica rufa*."

Champion[28] captured two specimens in 1903, at Woking, in the pine woods, running on the ground in company with *Formica rufa*.

The late W. E. Sharp, in one of his last letters to me, told me he took some four or five specimens in the runs of *F. rufa*, in July, 1915, at Crowthorne.

The above (with the exception of the rest of my own rather numerous records [22] [24] [25] [26] [27] [29] [31] [33] [34] [35] [36] [37] [38] [39] [40] [41] [47]) appear to be the only occasions when it has been published as being found with ants in Britain.

On the continent it is probable that the single example of *C. 7-punctata* recorded from Finland, in 1843, as being taken with *F. rufa* by Mannerheim[3], may have been really *C. distincta*. The first real record (and the only one as far as I am aware) of this Lady-Bird being attached to ants on the continent is by Wasmann[35], in 1912. He writes:—

". . . . . I have convinced myself that it belongs to the regular myrmecophiles. In 1900 H. Donisthorpe reported its regular presence with *Formica rufa* at Weybridge, in England. He also made experiments with it, and noted that it was indifferently treated by the ants, while the very similar *septempunctata* was attacked by them. In the neighbourhood of Luxemburg town I found during the last ten years *Coccinella distincta*, but only always in the close neighbourhood of ants' nests. With *Formica truncicola* it was commonest, a little rarer with *F. pratensis*, with *Polyergus rufescens* with *F. rufibarbis* as slaves, with *Myrmica laevinodis* and *Camponotus ligniperda*." It is true, he states, that in 1894 [*Krit. Ver. Myr. Ter. Art.* (1894)] he held "its presence with ants only to be accidental"; but as a matter of fact he never mentioned it by name, and only wrote of the *Coccinellidae* (l.c., p. 161): "Regular myrmecophiles of this family are not known to me with certainty."

I first captured *C. distincta* on March 29th, 1894, in the High Woods at Bexhill, when it was crawling on the hillocks of *Formica rufa*, and sheltering under dead leaves on the nests; and I have found it with this ant in various other localities, and continuously at Weybridge ever since. In the last named locality it has occurred in every month in the year, on the nests and all trees and plants (Scots fir, birch, oak, sallow, and heather, etc.) in their vicinity, and also flying round the ants' hillocks, often in company with *Clythra quadripunctata* in hot sunny weather. I give a complete list from my myrmecophilous note books, of all the localities and dates I have seen the beetle in nature.

In company with *Formica rufa*, Bexhill, 29. iii. 1894. Weybridge, 28. ix. 1894: 19. iii. 1895: 20. iv. 1895: 29. v. 1895: 20. iii. 1897. Blean Woods, 11. v. 1901. Pamber Forest, 20. iv. 1902. Weybridge,

26. iv. 1902: 22. ii. 1903: 13. v. 1906: 7. iv. 1908: 9. v. 1908. Bewdley, 31. v. 1908. Blean Woods, 22. vi. 1908. Weybridge, 5. vii. 1909. Bewdley, 22. vii. 1909. Woking, 21. v. 1913: 4. vi. 1913. Bewdley, 7. vi. 1916. Weybridge, 8. vii. 1916: 5. vi. 1918: 3. vii. 1918: 27. viii. 1918: 3. ix. 1918: 18. ix. 1918: 9. x. 1918: 14. xi. 1918: 28. xii. 1918: 27. i. 1919: 28. ii. 1919: 14. v. 1919: 21. v. 1919: 30. v. 1919: 25. vi. 1919: 8. vii. 1919: 11. vii. 1919: 15. vii. 1919: 24. vii. 1919: 28. vii. 1919: 12. viii. 1919: 16. ix. 1919: 18. x. 1919.

In 1900 I[24] pointed out that when *C. distincta* was walking about among many ants on the hillocks at Weybridge, it would now and again duck down flat. I introduced into the nests some of the common *C. septempunctata*; the ants which had paid no attention to *C. distincta* endeavoured to attack *C. septempunctata*. The latter ducked down also, and as the legs and antennæ in the *Coccinellidae* can be packed close to the body, the ants had nothing to lay hold of, their jaws slipping off the smooth surface of the elytra. When unmolested again the beetle walked on a little, and eventually got away I stated that I was now sure that *C. distincta* belonged to the protected group of Myrmecophilous Coleoptera, and that its larva no doubt fed on the *Aphidae* and *Coccidae* that occur in the nests of *Formica rufa*.

This is not the case with the larvæ of *C. distincta*, as we shall subsequently see. Wasmann[35] states that the ant species, with which it is most frequently found (*F. rufa*, etc.), do not keep any *Aphidae* or *Coccidae* in their nests, but only seek such species to milk as occur everywhere outside their nests. He is not quite correct in stating that *F. rufa* keeps neither Aphids nor Coccids in its nests, as I have taken of the former—*Lachnus formicophilus*, a species discovered by me new to science, and only known from such situations; *Schizoneura corni*; and *Aphis plantaginis*; and of the latter—*Orthezia cataphracta*; and *Newsteadia floccosa* in *rufa* nests. They do not, however, occur in anything like sufficient numbers to serve as food for the Lady-Bird's larvæ.

Again, on April 21st, 1903[27], I made experiments with *C. distincta* and its treatment by the ants. Having introduced a specimen, which I had taken at Pamber Forest, into my observation-nest of *F. rufa*, the ants were unable to seize it, its defence being to retract the legs and antennæ and duck down, when the ants' jaws slipped off its shiny elytra. When an ant was forced to take hold of the beetle's leg, it let go at once. Another ant held on for some little time, dragging the beetle about. The Lady-Bird remained motionless with all the other legs retracted, and the yellow exudation, which is excreted by the *Coccinellidae*, was very apparent. The ant then let go and appeared to be very upset, walking round in circles, and was very languid for a long time afterwards, the beetle walking away unhurt.

The experiments with *C. distincta* and *C. septempunctata* were repeated last year (August 27th, 1918)[39] in nature, for the benefit of Mr. Blair, when he went with me to Weybridge, and he was much impressed by them. Specimens of both species were placed on the *rufa* hillocks among the ants. The former were only slightly attacked and quickly got away, but the latter were vigorously assailed; one specimen had its leg seized by an ant, and only after some little time had elapsed escaped with difficulty.

On May 31st, 1908[3 3], I observed specimens of *C. distincta* crawling out of a nest of *Formica rufa* at Bewdley, and a number of the Lady-Birds were found to be present about other nests. This was the first record for the Midlands. When publishing a note on this discovery, I stated, "My present view is that these beetles seek the nests of *Formica rufa* for hibernation, and leave in the spring or early summer." [My subsequent investigations, both in the field and with an observation nest at home, have failed to prove this theory.]

On July 3rd, 1918, I found, at Weybridge, the larvæ of *C. distincta* in some numbers, feeding on Aphids, attended by ants on a fir tree over a *rufa* nest. A number, most of them being nearly full grown, were taken home and placed on fir boughs, on which were plenty of Aphids, in my large *rufa* observation nest. They fed on the plant-lice, and on July 4th two of the larvæ had fixed themselves on the muslin over the nest, ready to pupate. One of these turned to a pupa on July 6th, and the other on July 7th. Others fixed themselves on the pine needles of the boughs, and some on the frame of the nest, and all were in the pupal state by July 9th. The two first to pupate became perfect insects on July 15th, having spent eight and nine days respectively in the pupal state. By July 20th all had reached the imago state. Some of these I set, and the rest I took down to Weybridge on my next visit and let loose. I may mention that the ants never paid any attention to the larvæ or pupæ. I now determined to try and find out if the *Coccinella* did hibernate in the *rufa* nests. Having planted a small fir tree in my large observation nest, and supplied it with Aphids, I brought up from Weybridge on August 27th, 1918, a number of the beetles and established them in my nest. The plant-lice soon died off, or were devoured by the beetles; but I found the latter would eat the honey supplied to the ants, often sitting among the ants feeding on the honey. They spent the whole winter on the fir tree and about the nest; a certain number disappeared, but the rest were present in February, the ants having retired into the sand beneath the débris of the nest long before this, when it first got cold. The nest was kept in a room at the top of the house, with no fire, which of course was very cold during the winter.

On November 14th all the ants in the *rufa* nests at Weybridge had gone to ground for the winter, but the Lady-Bird was still abundant on the trees over the nests.

On February 28th, 1919, I went down to Weybridge and dug up the *rufa* nest under the fir tree, where I had found the *Coccinella* larvæ the year before, which, being in the shade, showed no signs of life. (The ants of another nest, which was in the open, were coming up and massing in the sun at the entrances to the nest.) The ants in the first nest were right below the hillock, in earth chambers, some 2½ feet down, and I found one Lady-Bird with them, dormant, but quite alive. When placed in a box it soon became active. Others were as usual on the trees over the nests.

On March 1st I dug up my nest at home, but the most careful search only produced one of the *Coccinella*, which was with the ants in the sand beneath the hillock of the nest. It would thus appear that a few specimens may hibernate in the nests, but the great number pass the winter in the trees over them.

The next step was to find the eggs of the insect, when, where, and

how they were laid. May 14th found me again at Weybridge, and the day being very hot many of the Coccinellids, which were abundant, were flying about round the nests and trees in company with *Clythra quadripunctata*. The copulation of several couples was observed—the male sits far back on the female, his front tarsi resting on the large black central spots on her elytra, his body vibrating now and then. It being evidently a little too early for the eggs, several couples were taken home and placed in a large box with a glass lid, and supplied with fir-boughs, plant-lice, and honey.

My next visit to Weybridge was on May 21st, in company with my colleague, Mr. Crawley, and after a long hunt I found a bunch of eggs on the underside of a pine-needle. The eggs were long and of a bright yellow colour, and were laid in rows like a lot of little barrels placed close together, two and three abreast. As far as I am aware the ova of this beetle had never been found before. As no more were seen by either of us, after the most careful search, it was probably still somewhat early for the eggs. On May 30th, however, I was more successful, clusters of eggs being found on fir, birch, and oak trees over *rufa* nests, always on the underside of the leaves, or pine needles; the number of eggs present in a bunch varied—7, 12, 14, and 20 being noted. About 1 o'clock a female was observed laying eggs on the underside of a leaf on a young oak tree, round which a large *rufa* hillock had been built. After laying an egg she advanced a little and laid another just in front of those behind, 20 in all being laid. When she had finished she walked quickly away, and I captured her. This female laid more eggs on June 3rd, in captivity, and these eggs hatched on June 8th. Some of the Lady-Birds, in captivity in the glass-topped box mentioned above, laid eggs; but these were always devoured by the others. Copulation was also noted in captivity on June 7th; on this occasion the female swayed rapidly from side to side every now and then, as if she wished to shake off the male.

I was successful in rearing two specimens right through from the egg to the perfect insect. This was only accomplished with considerable difficulty. I tried them on fir-boughs placed in water, but the Aphids on the boughs soon died, or fell off, as did also the young Coccinellid larvæ; in plaster nests, but if kept too damp they died when moulting, and if too dry they died at once; they also devoured each other. Eventually I kept each larva by itself in a small glass-topped box, with a little wet cotton wool to keep the atmosphere moist, and this required to be damped frequently in the hot weather. I supplied them with any plant-lice I could get hold of—off fir, birch, oak, mountain ash, nettles, rose trees, and ivy. They did not appear to care for the rose Aphis much, but devoured the ivy species very readily.

The following is the time table of the two specimens successfully reared:—

A. Eggs on the underside of a pine-needle (probably laid the day they were found) found at Weybridge May 21st, 1919.

Hatched	May 25th.
1st Moult	May 30th.
2nd Moult	June 4th.

B. Female observed laying eggs on the underside of an oak-leaf at Weybridge, May 30th, 1919.

Hatched	June 6th.
1st Moult	June 10th.
2nd Moult	June 15th.

3rd Moult June 12th.	3rd Moult June 18th.
4th Moult June 15th.	4th Moult June 21st.
Larva fastened up ready to pupate, June 22nd.	Larva fastened up ready to pupate, June 23rd.
Pupa, June 22nd.	Pupa, June 28th.
Perfect Insect, July 9th.	Perfect Insect, July 11th.

The newly hatched larvæ are of a dark bluish-grey colour, and after the first moult yellow spots begin to show. After the fourth moult they are dark blue with very distinct yellow spots. Before pupating the colour changes to grey. The pupa is at first bright yellow, which changes to a delicate pinkish yellow, with darker light violet-grey marks, which later become black. When the perfect insect has first emerged from the pupal skin, it is a very light yellow, the thorax being a little darker, and the wings are extended. In about two hours the wings are withdrawn beneath the elytra, and the insect acquires the normal colour in about 24 hours.

One other larva got as far as to fasten itself up ready to pupate, but it never changed to a pupa.

The larvæ are very voracious, and devour large quantities of *Aphidae*, and I imagine the differences in the times spent between the moults, etc., depends on the amount of food they were able to obtain, and probably also on the weather. The egg measures 1·8 mm. in length, and ·5mm. in the centre. It is of a bright yellow colour, and narrowed towards each end, being slightly broader and more rounded at the upper, than at the lower end. It is covered with a thin membrane, which forms a flat round disc at the lower end, where it is fastened to the leaf on which it is laid.

The full-grown larva measures from 10·5mm to 11mm. in length; and the pupa from 6mm. to 6·5mm. in length.

Fowler[1 8] gives the length of the imago as 5·5mm. to 7·5mm.; and Ganglbauer[2 3], 5·5mm. to 8mm. The smallest specimen I have taken measures 6·5mm., and the largest 8·5mm. in length.

Rosenhauer[1 3], in the paper before mentioned, states—"Truly only one generation occurs." I believe this to be the case as a rule, but this year, perhaps on account of the very hot weather in the early summer, there appear to have been two generations. On August 26th, 1919, I was unable to find any imagines (this is the only time I have ever been to Weybridge and not seen the perfect insect when I have looked for it); but larvæ, of all sizes, were abundant on the trees over the nests. As we have seen eggs were laid in May which produced beetles early in July. The eggs from which these August larvæ hatched, must have been laid at the end of July and the beginning of August.

(*To be concluded.*)

NOTES ON COLLECTING, Etc.

Hylotrupes bajulus near Weybridge.—In August last, while searching for Coleoptera in the neighbourhood of Weybridge, I was fortunate enough to meet with *Hylotrupes bajulus*, L., again. My first capture of this fine Longicorn in this vicinity was made in my garden and duly recorded by me in the *Ent. Mo. Mag.* [52, 261